LEGEND

- POX — NORMALLY OPEN SMOKE DETECTION PANEL OUTPUT RELAY CONTACT
- POX — NORMALLY CLOSED SMOKE DETECTION PANEL OUTPUT RELAY CONTACT
- DELUGE WATER SOLENOID VALVE (24 VDC COIL)
- SC — EXISTING SMOKE DETECTOR CONTACT TO BE REMOVED
- TERMINAL IN SMOKE DETECTION PANEL OR EXISTING MCC
- TERMINAL IN EXISTING SMOKE DETECTION PANEL
- (A) SMOKE DETECTION PANEL ALARM BELL
- (T) SMOKE DETECTION PANEL TROUBLE CHIME
- SMOKE DETECTION PANEL
- EXISTING EQUIPMENT (TYPE INDICATED ON DRAWINGS)
- RMT — REMOTE MULTIPLEX TERMINAL
- FUSE CUTOUT FOR SMOKE DETECTION PANEL
- XL PANEL No. / CARD #1 / LOOP #1 / DETECTOR #1 — DEVICE ADDRESS NOMENCLATURE
- 041101 (S) — AREA HIGH VELOCITY TYPE SMOKE DETECTOR 3/4" FLEX. CONN. WITH (1) TWISTED PAIR No. 16
- (A) — AREA TYPE SMOKE DETECTOR 3/4" FLEX. CONN. WITH (1) TWISTED PAIR No. 16
- (D) — DUCT TYPE SMOKE DETECTOR 3/4" FLEX. CONN. WITH (1) TWISTED PAIR No. 16
- TRX-2R-4-1 — MANUAL SWITCH INTERFACE UNIT
- CONNECTION TO DELUGE SOLENOID VALVE (24 VDC) 3/4" FLEX. CONN. W/2#14
- WF — CONNECTION TO SPRINKLER VALVE WATERFLOW SWITCH
- TS — CONNECTION TO SPRINKLER VALVE TAMPER SWITCH
- M — MANUAL PULL STATION
- HORN/STROBE ALARM STATION
- (J) — JUNCTION BOX
- CENTERLINE OF EXISTING HVAC DUCT
- DENOTES EXISTING WIRING TO BE REMOVED
- INDICATES EXISTING EQUIPMENT
- CDT, C — CONDUIT, SIZE AS SHOWN
- ACS — AIR CONDITIONING SUPPLY FAN
- ACR — AIR CONDITIONING RETURN FAN
- E — EXHAUST FAN

GENERAL NOTES

1. HEAVIER WEIGHTED LINES ON ALL CONTRACT DWGS DENOTES EQUIPMENT AND WIRING TO BE FURNISHED AND INSTALLED UNDER THIS CONTRACT.
2. FOR EXACT LOCATION OF VALVES AND SPRINKLER PIPING SEE CONTRACT DRAWING NUMBERS SP-1 TO SP-5
3. THE ELECTRICAL WORK CONSISTS OF FURNISHING AND INSTALLING THE FOLLOWING EQUIPMENT:
   A. EIGHT (8) SMOKE DETECTION SYSTEM PANELS TYPE XL.
   B. ADDRESSABLE INPUT DEVICES & INTERFACE MODULES FOR MISCELLANEOUS DRY CONTACTS.
   C. AUDIO/VISUAL ALARM STATIONS.
   D. WIRING, CONDUIT, JUCTION BOXES, CABINETS, MODEMS, BOARDS, AND ALL NECESSARY HARDWARE & SOFTWARE TO RENDER THE SYSTEM OPERABLE.
   E. REMOVAL OF OLD DETECTORS ONLY AFTER THE NEW SYSTEM HAS BEEN INSTALLED AND SIMULATION TESTED TO THE SATISFACTION OF THE ENGINEER.
4. THE CONTRACTOR SHALL INSTALL THE SMOKE DETECTION SYSTEM AS REQUIRED BY THE SPECIFICATIONS AND CONTRACT DRAWINGS EXCEPT FOR THE TERMINATION OF THE SHUTDOWN (POX) CONTACTS. AFTER COMPLETING THE INSTALLATION THE CONTRACTOR SHALL PERFORM A SIMULATION TEST IN THE PRESENCE OF THE ENGINEER AND OF THE PYROTRONICS REPRESENTATIVE. THE SIMULATION TEST SHALL BE PERFORMED TO VERIFY THE PROGRAMMING AND THE INTEGRITY OF ALL INPUT AND OUTPUT CIRCUITS. THE SIMULATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   A. ACTIVATING ALL INPUT DEVICES SHOWN ON THE ANNUNCIATOR MESSAGE AND SHUTDOWN SCHEDULE DRAWINGS FOR EACH RESPECTIVE PANEL.
   B. OBSERVING THE RESULTANT OPERATIONS INCLUDING OUTPUTS (POX) UNDER ALL CONDITIONS ABOVE.
   C. COMPLETE CONNECTION OF POX CONTACTS AND RETEST TO PROVE-OUT PROPER OPERATION.
5. SMOKE DETECTOR REMOVAL:
   a. AT DUCT SMOKE DETECTORS - DISCONNECT AND REMOVE EXISTING HIGH VOLTAGE DUCT SMOKE DETECTORS AND REPLACE WITH JUNCTION BOX. COIL WIRE IN BOX, LABEL SPARE AND IDENTIFY DESTINATION OF WIRES AT BOTH ENDS (IN THE EXISTING SMOKE DETECTOR ANNUNCIATOR PANEL AND AT THE JUNCTION BOX).
   b. AT ALL EXISTING HIGH VOLTAGE SMOKE DETECTION PANELS DISCONNECT ALL RELAYS ASSOCIATED WITH THE ZONES MADE INOPERATIVE BY THE REMOVAL OF THE HIGH VOLTAGE DETECTORS AND CONTINUE THE SERVICE TO THE ACTIVE ZONES THAT REMAIN. REMOVE ALL LABELS FROM EXISTING EQUIPMENT ON SMOKE DETECTOR ANNUNCIATOR PANEL MADE INOPERATIVE AND LABEL "OUT OF SERVICE".
   c. WIRING - FOR EACH AFFECTED ZONE, DISCONNECT INTERCONNECTING WIRES BETWEEN EXISTING SMOKE DETECTOR ANNUNCIATOR PANEL AND EXISTING TERMINAL CABINET. SPARE WIRES SHALL BE LABELED AS DESCRIBED IN PARAGRAPH 'a' ABOVE.
   d. RETURN ALL REMOVED SMOKE DETECTION EQUIPMENT TO THE ENGINEER
6. THE SPACE AROUND CONDUITS PENETRATING RATED WALLS OR FLOORS SHALL NOT EXCEED 1/2" AND SHALL BE PACKED SOLID WITH "THERMOFIBER" AND BE SEALED WITH A NON HARDENING COMPOUND AND SHALL BE UL LISTED FOR THE USE.
7. CONDUIT ROUTING IS SHOWN DIAGRAMATICALLY. CONTRACTOR SHALL ROUTE CONDUIT AS PER FIELD CONDITIONS. ALL NECESSARY JUNCTION BOXES, CONDUIT FITTINGS, AND SUPPORTS THAT ARE REQUIRED DUE TO EXISTING FIELD CONDITIONS SHALL BE INSTALLED BY THE CONTRACTOR. UPON COMPLETION OF THE CONTRACT, THE CONTRACTOR SHALL FURNISH "AS-BUILT" DRAWINGS SHOWING THE FINAL CONDUIT ROUTING.
8. DELUGE RELEASE SYSTEM IS ASSOCIATED WITH A.C. SUPPLY FANS ONLY.
9. ALL WIRING FOR THE SMOKE DETECTION SYSTEM SHALL BE AS DESCRIBED IN THE SPECIFICATIONS AND AS SHOWN ON THE CONTRACT DWGSUNLESS OTHERWISE SHOWN FIRE ALARM CABLE SHALL HAVE INSULATION OF TEFLON OR EQUIVALENT AND SHALL BE OF A TYPE THAT WILL NOT SUPPORT FLAME, BE CAPABLE OF WITHSTANDING A 600V INSULATION BREAKDOWN TEST AND BE U.L. LISTED FOR THESE REQUIREMENTS. CABLE SHALL BE PROTECTED WITH A SHEATH AND AN OUTER JACKET OF NON-HALOGEN, LOW SMOKE, LOW TOXICITY MATERIAL COLORED FIRE DEPT. RED AND LABELED FOR ITS ENTIRE LENGTH "FIRE ALARM SERVICE". CABLE SHALL HAVE RECEIVED CERTIFICATION FOR USE UNDER N.E.C. SECTION 760 AND UNDER N.Y.C. BUILDING CODE REFERENCE STANDARD RS 17-3A CLASS E.
10. ALL WIRING ASSOCIATED WITH THE SMOKE DETECTION SYSTEM SHALL BE RUN IN RIGID GALVANIZED STEEL CONDUIT. MINIMUM SIZE TO BE 3/4"
11. FOR MORE DETAILED INFORMATION ON EQUIPMENT AND DUCTWORK, SEE ATTACHED MECHANICAL REFERENCE DRAWINGS.
12. FOR ADDITIONAL DETAILS AND INFORMATION, SEE ATTACHED ELECTRICAL REFERENCE DRAWINGS E-A-2, 3, 12, 13, 23, 24, 44, 45, 65, 66, 107 AND E-B-2, 3, 12, 13, 23, 24, 44, 45, 65, 107.
13. ALL CONDUCTORS IN VERTICAL RACEWAYS SHALL BE SUPPORTED IN ACCORDANCE WITH THE N.Y.C. ELECTRICAL CODE, ARTICLE 4.

SYSTEM OPERATION AT ALL MERs

1. UPON ACTIVATION OF A SUPPLY DUCT SMOKE DETECTOR OR THE ASSOCIATED FAN CASING AREA SMOKE DETECTOR OF A SUPPLY FAN, THE FOLLOWING OCCURS:
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. AN AUDIBLE ALARM BELL IN THE MECHANICAL EQUIPMENT ROOM IS ACTIVATED.
   c. THE AFFECTED AC SUPPLY FAN IS SHUTDOWN.
2. UPON ACTIVATION OF A SUPPLY DUCT SMOKE DETECTOR AND ASSOCIATED FAN CASING AREA SMOKE DETECTOR OF A SUPPLY FAN (CROSS ZONING), THE FOLLOWING OCCURS:
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. THE AUDIBLE ALARM BELL IN THE MECHANICAL EQUIPMENT ROOM REMAINS ACTIVATED.
   c. THE AFFECTED AC SUPPLY FAN DELUGE SOLENOID VALVE IS ACTIVATED.
   d. THE AFFECTED RETURN AIR FAN (ACR) IS SHUTDOWN. IN ADDITION, ALL RETURN AIR FANS ASSOCIATED WITH A SPILL AIR PLENUM ARE SHUT DOWN.
   e. THE AC SUPPLY FANS FED FROM THE SPILL AIR PLENUM ASSOCIATED WITH THE AFFECTED RETURN AIR FANS ARE SHUTDOWN.
3. UPON ACTIVATION OF A RETURN DUCT SMOKE DETECTOR OF ANY RETURN AIR FAN ASSOCIATED WITH EACH RETURN AIR PLENUM, THE FOLLOWING WILL OCCUR :
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. THE AUDIBLE ALARM BELL IS ACTIVATED IN THE MECHANICAL EQUIPMENT ROOM.
   c. THE AFFECTED RETURN AIR FAN IS SHUTDOWN AS WELL AS THE OTHER RETURN AIR FAN ASSOCIATED WITH THE RETURN AIR PLENUM SHAFT.
   d. THE AC SUPPLY FANS FED FROM THE SPILL AIR PLENUM ASSOCIATED WITH THE AFFECTED RETURN AIR FANS ARE SHUTDOWN.
4. ACTIVATION OF A WATER FLOW SHUTOFF VALVE TAMPER SWITCH PRODUCES A TROUBLE MESSAGE ON THE SMOKE DETECTION PANEL AND THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER. AN AUDIBLE CHIME IS ACTIVATED.
5. ACTIVATION OF THE WATERFLOW SWITCH PRODUCES AN ALARM MESSAGE ON THE SMOKE DETECTION PANEL AND THE REMOTE CENTRAL CONTROL PANEL (CXL). AN AUDIBLE ALARM BELL IS ACTIVATED.
6. SMOKE PURGE (BY-PASS) OPERATION

   THE EXISTING PURGE (BY-PASS) SWITCHES SHALL REMAIN IN THEIR PRESENT STATE. THE PURGE SWITCH FUNCTION SHALL REMAIN AS IS. HOWEVER, ACTIVATION OF A PURGE SWITCH SHALL PRODUCE AN AUDIBLE CHIME AS WELL AS A MESSAGE ON THE ASSOCIATED SMOKE DETECTION (XL) PANEL, THE REMOTE CENTRAL CONTROL PANEL (CXL), VIDEO DISPLAY TERMINAL, AND PRINTER.

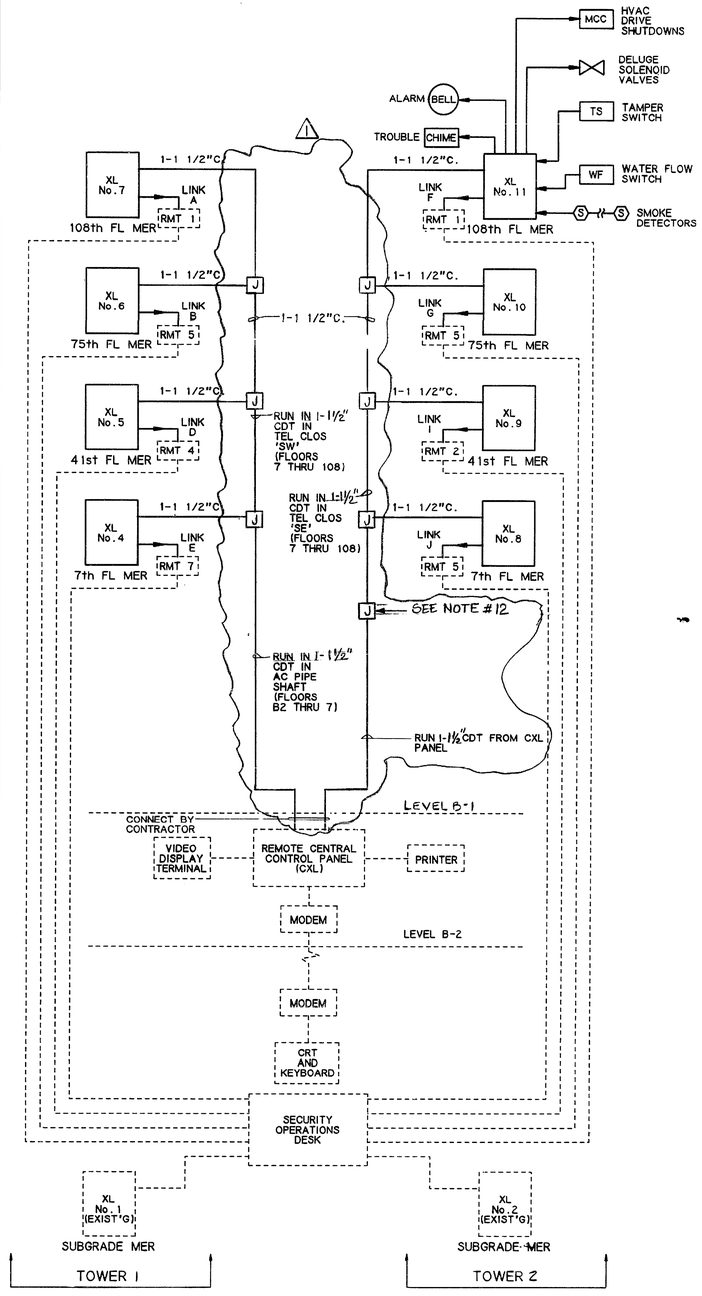
IN ADDITION AT THE 7th FLOOR MER ONLY

1. UPON ACTIVATION OF A DUCT SMOKE DETECTOR OR AN AREA SMOKE DETECTOR ON THE LOBBY SUPPLY AIR FAN OR THE CORE AREA SUPPLY AIR FAN, THE FOLLOWING WILL OCCUR :
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. AN AUDIBLE ALARM BELL IN THE MECHANICAL EQUIPMENT ROOM IS ACTIVATED.
   c. THE AFFECTED AC SUPPLY FAN IS SHUTDOWN.
2. UPON ACTIVATION OF A DUCT SMOKE DETECTOR AND A FAN CASING AREA SMOKE DETECTOR, (CROSS ZONING) ON THE LOBBY SUPPLY OR THE CORE AREA SUPPLY AIR FAN THE FOLLOWING OCCURS :
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. THE AUDIBLE ALARM BELL IN THE MECHANICAL EQUIPMENT ROOM REMAINS ACTIVATED
   c. THE AFFECTED AC SUPPLY FAN DELUGE SOLENOID VALVE IS ACTIVATED.
   d. THE ASSOCIATED LOBBY RETURN AIR FAN (ACR) IS SHUTDOWN WHEN THE LOBBY AC SUPPLY FAN IS IN THE CROSS ZONING CONDITION.
3. UPON ACTIVATION OF A DUCT SMOKE DETECTOR ON THE LOBBY OR CORE AREA RETURN AIR FAN, THE FOLLOWING WILL OCCUR :
   a. AN ALARM MESSAGE APPEARS ON THE ASSOCIATED SMOKE DETECTION PANEL AND ON THE REMOTE CENTRAL CONTROL PANEL (CXL) VIDEO DISPLAY MONITORS AND PRINTER.
   b. THE AUDIBLE ALARM BELL IS ACTIVATED IN THE MECHANICAL EQUIPMENT ROOM.
   c. THE AFFECTED RETURN AIR FAN IS SHUTDOWN.
   d. THE AC SUPPLY FAN FED FROM THE AFFECTED RETURN AIR FAN IS SHUTDOWN.

CONNECTION TO EXISTING RMT SYSTEM

1. ALARM AND TROUBLE SIGNALS FROM EACH XL-3 PANEL SHALL BE SENT TO THE SECURITY OPERATIONS DESK VIA THE NEAREST RMT PANEL (SEE FUNCTIONAL DIAGRAM THIS DRAWING). CONTRACTOR IS REQUIRED ONLY TO BRING CONDUIT AND WIRING TO THE RESPECTIVE RMT PANEL. FINAL CONNECTIONS AT THE RMT PANEL WILL BE MADE BY OTHERS

NOTE: XL No. 11 SHOWS TYPICAL INPUTS AND OUTPUTS FOR EACH SMOKE DETECTION PANEL. SEE DWGS. E-7 THROUGH E-14 FOR INDIVIDUAL XL PANEL RISER DIAGRAMS.



FUNCTIONAL DIAGRAM

THE PORT AUTHORITY OF NY & NJ

ENGINEER OF DESIGN E.D.D., PORTS AND WORLD TRADE

CHIEF ELECTRICAL ENGINEER

Engineering Department
Design Divisions

World Trade Center

Title

TOWER M.E.R'S SPRINKLER INSTALLATION AND MODIFICATION TO SMOKE DETECTION SYSTEM

ELECTRICAL

LEGEND, GENERAL NOTES, SCOPE OF WORK, FUNCTIONAL DIAGRAM AND SYSTEM OPERATION DESCRIPTION

No.	Date	Revision	Approved
1	7-12-89	REV. ENCIRCLED AREA	B.R.

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Designed by	Drawn by	Task Leader
DaCOSTA/ AVENOSO	AVENOSO	PALANGO

Checked by

Date 5-15-89 Scale NONE

Contract Number WTC-499.18

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